California Waste Tire Generation, Markets, and Disposal

2002 Staff Report

October 2003

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Introduction

This report (*Waste Tire Management Program—2002 Staff Report*) provides an overview of the California Integrated Waste Management Board's (CIWMB) estimate of waste tires diverted. The data compiled to analyze the waste tire diversion rates are for calendar year 2002.

California is faced with the challenge of diverting or safely managing more than 33 million reusable and waste tires generated annually in the state. In addition, an estimated 1.5 million tires remain in unpermitted stockpiles in California. The state nearly doubled the number of waste tires recycled between 1991 and 2002, but the number of waste tires generated annually continues to exceed the number of tires diverted. CIWMB staff estimated that in 2002, 25.1 million of the 33.5 million reusable and waste tires generated (74.9 percent) were diverted from stockpiling or disposal.

This report focuses only on information on waste tires generated and markets for these tires. The report provides estimates of reusable and waste tire generation, consumption, and disposal in California for 2002.

For additional information on CIWMB's waste tire program, please visit our Web site at www.ciwmb.ca.gov/Tires/.

Estimate of Waste Tires Generated

The U.S. Environmental Protection Agency (U.S. EPA) calculates the number of waste tires by using the formula of one waste tire per person, per year to obtain an average for the nation. However, for the years between 1990 and 2000 CIWMB used a different factor for California: 0.915 tires per person, per year, which was developed by an industry survey in 1991 and 1992. In 2001, CIWMB staff reassessed the validity of this method of calculating the generation rate, and determined that the 0.915 factor needed to be updated.

To calculate the number of reusable and waste tires generated in the state, CIWMB primarily uses population statistics increases and state industry trends and approximations. Because of the changing economic infrastructure and the variety of tire-derived products available on the market, staff determined that the adjustment factor should be closer to the U.S. EPA number. Therefore, staff selected a number more representative of California's current condition and the national number. Consequently, the new adjustment factor used for 2001 and 2002 calculations is 0.958.

The Department of Finance's 2002 data indicates that California's population is estimated at 35 million. Using the 0.958 factor, CIWMB staff estimates that about 33.5 million reusable and waste tires were generated in California during 2002. Staff also obtained data from the Board of Equalization (BOE) on tire fees collected from car sales. However, since this data may not immediately translate to waste tire generation, staff was unable to use the data to verify the number of waste tires generated.

Staff anticipates that data from waste tire manifests[*] will eventually give a more accurate number; however, data will not be available until the year 2004. Once the data from the CIWMB's waste tire manifest system is available, staff may adjust the California factor again.

CIWMB staff also estimated that of the approximately 33.5 million reusable and waste tires generated in 2002, approximately 25.1 million of the tires (74.9 percent) were diverted for various alternatives, including reuse, retreading, and combustion. Table 1 presents waste tire generation, diversion, and disposal in California for 1990–2002. Further, because of the lack of a uniform reporting system in past years on tire recycling activities in California, CIWMB has also relied on estimates to quantify tires recycled or diverted from landfill disposal and stockpiling. Staff arrived at these estimates by using information from industry contacts who transport, process, and/or recycle large quantities of waste tires.

[*] Waste tire manifests are forms that accompany shipments of waste or used tires and that are completed by waste or used tire generators, haulers of waste and used tires, and operators of end-use facilities.

Markets for Waste Tires

Reuse

An alternative to disposal is tire reuse. After the purchase of new tires, the remaining reusable tires that still have a legal tread depth can be resold by a dealer, rather than being disposed of or recycled prematurely. Based on information from industry contacts, 1.5 million tires, or 4.5 percent of the estimated 33.5 million reusable and waste tires generated in 2002, were reused.

Rubberized Asphalt Concrete, Alternative Daily Cover, and Civil Engineering Uses

Based on information from industry contacts, CIWMB staff estimates about 5.8 million tires were used for rubberized asphalt concrete (RAC) and crumb rubber products,† including playground cover, speed bumps, carpet tile, mats, sound walls, and other various cut, stamped, or molded products. Staff estimates 5.9 million tires were used for other activities, including 3.9 million tires for alternative daily cover (ADC) and 2 million tires for uses such as landfill gas collection wells and uses on farmland. Approximately 3.0 million tires were used for civil engineering projects, such as landfill gas collection trenches, lightweight fill, and a levee reinforcement project.

Retreading

Tire retreading is a viable option for renewing reusable tires by reusing the tire casing after the legal tread has been worn off. Based on surveys, industry contacts, and information obtained from the Tire Retread Information Bureau's (TRIB—www.retread.org) "2002 Fact Sheet—Retreaded Tires" (www.retread.org/Facts/index.cfm/ID/226.htm), CIWMB staff has determined that approximately 2.3 million retreaded tires were sold in 2002 in California. Nearly all of these were for light-duty and commercial trucks.

Exported Tires

Tire export (consisting of both reusable and waste tires) reduces the number of tires requiring eventual disposal in California. According to industry contacts and staff estimates, approximately 2 million reusable and waste tires were exported in 2002.

Combustion

Tire combustion significantly reduces the number of tires requiring landfill disposal or stockpiling. In 2002, about 6.1 million tires were combusted as fuel in California (5 million were consumed by the cement manufacturing industry, and 1.1 million were consumed by a cogeneration plant in Stockton).

Imported Tires

CIWMB staff estimates that in 2002, approximately 1.5 million waste tires were imported into California for recycling from Utah, Oregon, Nevada, Arizona, and Canada. Imported waste tires were used in combustion as a fuel supplement and to generate crumb rubber. Imported tires have also been disposed of in landfills. While not all disposal facility operators kept track of data on imported tires disposed of in landfills in 2002, staff is now working with industry to track these imports more accurately. The interstate transport of waste tires is market-driven; neither State nor local governments can regulate imports and exports of tires. Factors influencing importation are

† In actuality, more tire rubber is used for RAC or crumb rubber products. However, the extra rubber used consists of tire buffings from tire retread operations. These tires are already accounted for as retreaded tires.

geographic proximity to end users and subsidies provided by other states or countries to facilitate collection, recycling, and disposal of waste tires.

Summary

It is apparent, primarily from industry contacts and trends, that waste tire disposal and stockpiling are decreasing, while waste tire diversion is increasing (Figure 1). In 1990, CIWMB staff estimated that 9.2 million tires (34 percent of the 27 million tires generated) were diverted from landfill disposal and stockpiling. In 2002, staff estimated that approximately 25.1 million California tires (74.9 percent of the 33.5 million tires generated) were diverted from the annual waste stream. Figures 2 and 3 provide estimates for reusable and waste tire recycling and disposal in California for 2002 and the period from 1990 to 2002.

Table 1. California Waste Tire Generation, Diversion, and Disposal, 1990–2002
(Numbers in millions of passenger tire equivalents [PTE][1])

A		C	D	E			F		G	H		I	J	K	L
Year	California Population (Millions)	Estimated Waste Tires Generated[2]	Reused	Recycling and Other Uses[3]			Retreaded[4]		Exported	Tire-Derived Fuel (TDF) Combusted		Imported[7]	Total Number of Calif. Tires Diverted[8]	Remaining Number of Calif. Tires Disposed Formula: C minus J	Percent of California Tires Diverted[9] Formula: J divided by C
							Light	Heavy		Energy Product[5]	Fuel Suppl.[6]				
1990	29.5	27.0	1.0	0.6			0.9	1.4	1.3	2.4	1.6	0.0	9.2	17.8	34.1%
1991	30.1	27.5	1.0	0.8			0.8	1.4	1.3	4.1	1.7	0.4	10.7	16.8	38.9%
1992	30.7	28.2	1.1	1.1			0.7	1.4	1.3	4.7	2.1	0.6	11.8	16.4	41.8%
1993	31.1	28.5	1.3	1.5			0.7	1.4	1.3	4.7	3.0	0.3	13.6	14.9	47.7%
1994	31.7	29.0	1.3	1.7			0.7	1.7	1.3	5.7	6.0	0.2	18.2	10.8	62.8%
1995	32.3	29.5	1.5	1.8			0.7	1.7	1.7	4.7	6.1	0.6	17.6	11.9	59.7%
1996	32.6	30.0	1.5	2.3			0.7	1.7	1.7	4.3	4.6	1.5	15.3	14.7	51.0%
1997	33.2	30.4	1.5	5.4			1.0	1.8	1.7	3.5	5.5	3.2	17.2	13.2	56.6%
1998	33.8	30.9	1.5	9.1			1.0	1.8	3.1	4.5	3.0	2.2	21.8	9.1	70.6%
				Crumb Rubber	Civil Eng.	Other									
1999	34.0	31.1	2.4	5.8	0.7	3.6	0.8	1.7	1.5	3.8	4.1	2.0	22.5	8.6	72.3%
2000	34.5	31.6	3.6	7.3	1.6	4.1	0.7	1.7	1.9	1.0	4.2	3.2	22.9	8.7	72.5%
2001	34.8	33.3	1.5	7.7	3.0	4.2	0.7	1.7	2.6	1.0	4.2	1.7	24.9	8.4	74.8 %
2002	35.0	33.5	1.5	5.8	3.0	5.9	0.6	1.7	2.0	1.1	5.0	1.5	25.1	8.4	74.9%

1 Based on 20-pound average weight of a passenger car scrap tire.

2 To estimate waste tires generated for 1990–2000, staff used the formula of 0.915 of a tire per person, per year. For 2001–2002, staff used the formula of 0.958 of a tire per person, per year.

3 This category includes tires used in ground rubber products and other products made from waste tires. It does not include tire buffings from retreading, because buffings are accounted for in the "Retreaded" category. However, since tire buffings are recycled, the number of waste tires recycled is greater than shown here. The three-way split in 1999 shows the number of tires diverted through crumb rubber products, civil engineering applications, and other uses (recycling, alternative daily cover, agriculture use, etc.).

4 “Light” refers to passenger and light-truck tires. “Heavy” refers to heavy-duty truck tires. Tire buffings are included during the retreading process.

5 This figure represents the number of tires combusted in power plants primarily from the annual waste tire stream, but may also include some stockpiled tires from site cleanups.

6 This figure represents the number of tires combusted primarily from the annual waste tire stream, but may also include some stockpiled tires from site cleanups.

7 This figure includes tires imported for combustion as a fuel supplement or used to generate crumb rubber. It does not include imported tires disposed of in landfills.

8 This figure is determined by summing the number of tires reused, recycled, retreaded, exported, combusted for energy production, and combusted as fuel supplement, and then subtracting the number imported. The figure represents the total number of tires diverted, primarily from the annual waste stream.

9 This figure represents the percentage of California waste tires diverted primarily from the annual waste stream.

Figure 1: Estimated Waste Tire Diversion and Disposal, 1990–2002 (Numbers in millions of PTEs)

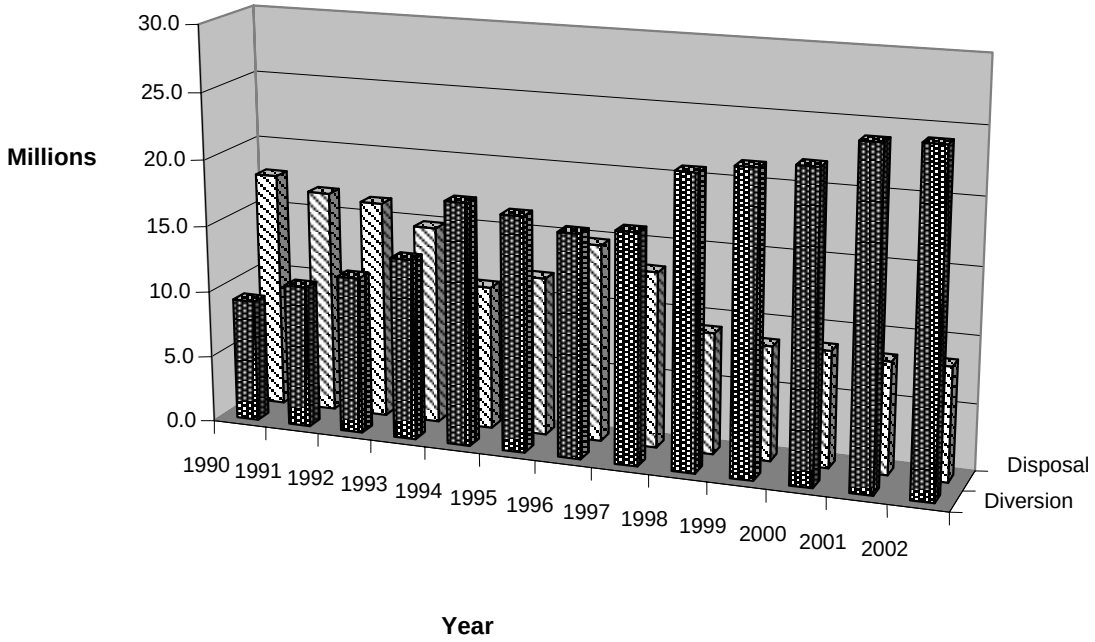

Figure 2: Estimated Reuseable and Waste Tire Recycling and Disposal, 2002
(Numbers in millions of PTEs)

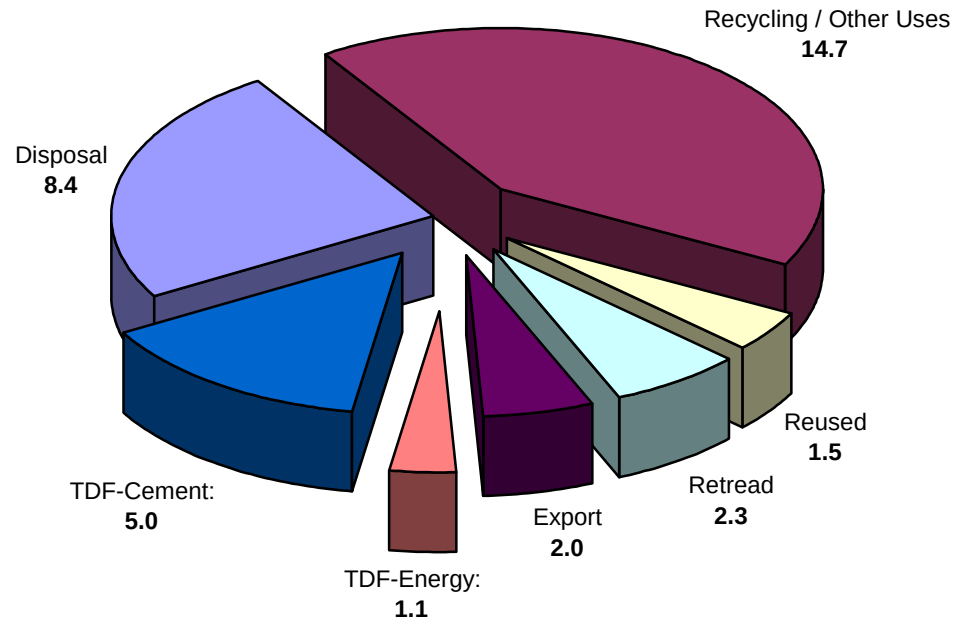

Figure 3: Estimated Reuseable and Waste Tire Recycling and Disposal, 1990–2002 (Numbers in millions of PTEs)